



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,099	01/29/2007	Christine Rademacher	P02074US2A	9529
7590 10/01/2009 Bridgestone Americas Holding Inc Chief Intellectual Property Counsel 1200 Firestone Parkway Akron, OH 44317-0001			EXAMINER	
			BOYLE, ROBERT C	
			ART UNIT	PAPER NUMBER
			1796	
			MAIL DATE	DELIVERY MODE
			10/01/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/560,099	<b>Applicant(s)</b> RADEMACHER ET AL.
	<b>Examiner</b> ROBERT C. BOYLE	<b>Art Unit</b> 1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 24 June 2009.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-12 and 21-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-12 and 21-32 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1668)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

*Response to Amendment*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Any rejections stated in the previous Office Action and not repeated below are withdrawn. In particular, the 112 rejection of claim 4 is withdrawn because the antecedent basis was corrected.
3. The new grounds of rejection set forth below are necessitated by applicant's amendment filed on June 24, 2009. In particular, new claims 21-32 have been added. In addition, new grounds of rejection are being applied to claims 1-12. Thus, the following action is properly made NON-FINAL.

*Election/Restrictions*

4. Applicant's election of Group I, claims 1-12, in the reply filed on June 24, 2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
5. Claims 13-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 24, 2009.

***Claim Rejections - 35 USC § 112***

6. Claims 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claims 31-32 recite a formula and define the formula as being the alkoxy silane. However, the formula is the product of the reaction between the alkoxy silane and the polymer. Because it is unclear as to whether the claims are defining the product of the reaction or the alkoxy silane before the reaction, the scope of the claim is indefinite.

***Claim Rejections - 35 USC § 102***

8. Claims 1-3 and 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by **Ozawa** (WO 01/34658).

9. As to claims 1-3, 11-12, Ozawa teaches adding isocyanate siloxanes and isothiocyanate siloxanes, such as 3-isocyanatopropyltrimethoxysilane, to anionic living polymers which contain styrene/butadiene (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32).

10. It is acknowledged that Ozawa teaches polymerization with lanthanide coordination catalysts and not through anionic polymerization.

11. However, it is noted that while claim 1 claims a method for preparing a functionalized polymer, claim 1 makes use of the product-by-process format by use of the language, “an anionically-polymerized living polymer...” Case law holds that:

Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

12. To the extent that the process limitations in a product-by-process claim do not carry weight absent a showing of criticality, the reference discloses the claimed product in the sense that the prior art product structure is seen to be no different from that indicated by the claims. Specifically, it has not been shown how the polymers in claim 1 have a structure that is different from the polymers of Ozawa.

***Claim Rejections - 35 USC § 103***

13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Ozawa**. The discussion with respect to Ozawa as set forth in paragraphs 8-12 above is incorporated here by reference.

14. As to claim 5, Ozawa teaches adding isocyanate siloxanes and isothiocyanate siloxanes to anionic living polymers where the ratio of functionalizing agent to initiator is 0.1-150 to 1 (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32). The range of functionalizing agent to initiator taught by Ozawa, 0.1-150 to 1, overlaps with the claimed range, 0.3-1 to 1. It is well settled that where prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See MPEP 2144.05; *In re Harris*, 409, F.3.d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In re Peterson*, 315 F.3d

Art Unit: 1796

1325, 1329, 65 USPQ 3d 1379, 1382 (Fed. Cir 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

15. Claims 4 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ozawa** in view of **Hergenrother** (EP 0 801 078). The discussion with respect to Ozawa as set forth in paragraphs 8-14 above is incorporated here by reference.

16. As to claims 4 and 6-7, Ozawa teaches adding isocyanate siloxanes and isothiocyanate siloxanes to anionic living polymers where the ratio of functionalizing agent to initiator is 0.1-150 to 1 (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32). Ozawa does not teach using a lithium initiator.

17. Hergenrother teaches adding siloxane compounds to anionic living polymers of styrene/butadiene where the polymer initiator is an organolithium compound such as butyl-lithium in the presence of THF and triethylamine (abstract; page 2, lines 36-59; page 3, lines 1-49; page 4, lines 1-17; page 8, lines 1-35). Triethylamine and THF are polar coordinators as defined by the instant specification, see paragraph 0022.

18. It would have been obvious to one of ordinary skill in the art to use the lithium initiators of Hergenrother with the polymerization of Ozawa because both use styrene/butadiene rubbers for the tire industry and lithium initiators are well known in the art to polymerize dienes via anionic living polymerization (Hergenrother: page 2, lines 10-16, 55-59).

19. As to claims 8-9, Hergenrother teaches SBR polymers with 0-80 wt% styrene, specifically 35.7 wt%, and with 24.5 % vinyl configuration (abstract; page 2, lines 36-59; page 3, lines 1-49; page 4, lines 1-17; page 8, lines 1-35).

20. As to claim 10, it is the examiner's position that the cis/trans ratio is a result effective variable because changing it will clearly affect the type of product obtained. See MPEP 2144.05(B). Case law holds that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In view of this, it would have been obvious to one of ordinary skill in the art to utilize the cis/trans ratio within the scope of the present claims so as to produce desired end results.

21. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Ozawa** and **Hergenrother** (EP 0 801 078) in view of **Vitus** (US 4,409,368). The discussion with respect to Ozawa and Hergenrother as set forth in paragraphs 8-20 above is incorporated here by reference.

22. Ozawa and Hergenrother teach the reaction of isocyanato alkoxy silanes with anionically polymerized living polymers (see paragraphs 8-17 above).

23. Vitus teaches the formation of polymers of butadiene using anionic living polymerization using alkyl lithium initiators and polar coordinators where the polybutadiene has a relative ratio of cis to trans of 25.3 cis to 40.3% trans which corresponds to the claimed 3:5 ratio (abstract; col. 1, line 50-col. 2, line 33; col. 3, lines 6-35; col. 10, lines 1-52). It would have been obvious to one of ordinary skill in the art to use the method of Vitus to achieve the claimed ratios because Vitus teaches hard vulcanized rubbers which are formed from anionic living polymerization

Art Unit: 1796

which can be terminated by addition of a terminating agent (column 4, lines 27-43, 59-65) and Vitus teaches forming star polymers which would allow the ability to add more end-groups on each polymer, thus giving more functionality to each polymer.

24. Claims 1-11 and 21-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schreffler** (US 6,451,935) in view of **Ozawa** (WO 01/34658).

25. As to claims 1 and 21, Schreffler teaches functionalizing anionically prepared living polymers with functionalizing agents that include isocyanates (abstract; col. 1, line 65-col. 2 line 20; col. 3, lines 1-49; col. 5, line 42-col. 6, line 47; col. 7, line 65-68). Schreffler does not teach the specific isocyanate alkoxy silane recited in claim 1.

26. Ozawa teaches adding functionalizing agents of isocyanate siloxanes and isothiocyanate siloxanes, such as 3-isocyanatopropyltrimethoxysilane, to styrene/butadiene pseudo-living polymers (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32). It would have been obvious to use the isocyanate alkoxy silane of Ozawa with the polymers of Schreffler because polymers carrying the alkoxy silane functionality may couple via a condensation reaction and improve the cold flow resistance of the polymer (page 18, line 21-page 19, line 2) and using an isocyanate alkoxy silane such as 3-isocyanatopropyltriethoxysilane (“IPMOS”) results in a higher elongation at break and ML1+4@100°C when used with ZnCl<sub>2</sub> (Table V).

27. As to claims 2-3 and 22-23, Schreffler teaches copolymers of styrene-butadiene (col. 13, line 35-col. 14, line 15).

Art Unit: 1796

28. As to claims 4, 6, Schreffler teaches using a lithium initiator (col. 3, lines 1-49; col. 13, line 35-col. 14, line 15).
29. As to claims 5 and 24, Schreffler teaches adding the functionalizing agent in an amount of 80% of the initiator (col. 13, line 35-col. 14, line 15).
30. As to claims 7 and 25, Schreffler teaches using a polar coordinator (col. 6, lines 37-47).
31. As to claims 8-10 and 26-28, Schreffler teaches an example with 25 wt% styrene and 75 wt% butadiene (col. 13, line 35-col. 14, line 15). Schreffler does not recite the microstructure of the polymerized butadiene. However, Schreffler teaches essentially the same anionic polymer and process as that of the claimed, and one of ordinary skill in the art would have a reasonable basis to believe the anionic polymer of Schreffler exhibits essentially the same properties. Since the PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobvious difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).
32. Even if properties of the anionic polymer of the instant claims and the prior art examples are not the same, it would still have been obvious to one of ordinary skill in the art to make a anionic polymer having the claimed properties because it appears that the references generically embrace the claimed anionic polymer and one of ordinary skill in the art would have expected all embodiments of the reference to work. Applicants have not demonstrated that the differences, if any, between the claimed anionic polymer and the prior art give rise to unexpected results.
33. As to claims 11-12 and 29-32, Ozawa teaches using 3-isocyanatopropyltrimethoxysilane (page 14, lines 3-30).

34. Claims 8-9 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schreffler** (US 6,451,935) in view of **Ozawa** (WO 01/34658) and **Hall** (US 5,112,929). The discussion with respect to Schreffler and Ozawa as set forth in paragraphs 24-33 above is incorporated here by reference.

35. As to claims 8-9 and 26-27, Schreffler teaches functionalizing anionically prepared living polymers with functionalizing agents that include isocyanates (abstract; col. 1, line 65-col. 2 line 20; col. 3, lines 1-49; col. 5, line 42-col. 6, line 47; col. 7, line 65-68). Schreffler teaches an example with 25 wt% styrene and 75 wt% butadiene (col. 13, line 35-col. 14, line 15). Ozawa teaches adding functionalizing agents of isocyanate siloxanes and isothiocyanate siloxanes, such as 3-isocyanatopropyltrimethoxysilane, to styrene/butadiene pseudo-living polymers (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32). Schreffler and Ozawa do not teach the claimed microstructure of the polymerized butadiene.

36. Hall teaches preparing diene copolymers having 20-95% 1,2-microstructure through anionic polymerization (abstract; col. 2, lines 1-68; col. 3, lines 23-60; col. 5, lines 3-11). It would have been obvious to have the microstructure taught by Hall in the polymers of Schreffler because a high 1,2 microstructure because the 1,2 microstructure allows for easier crosslinking because the pendant vinyl groups would be more accessible to any crosslinking agents.

37. Claims 8-10 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schreffler** (US 6,451,935) in view of **Ozawa** (WO 01/34658) and **Vitus** (US 4,409,368). The

discussion with respect to Schreffler and Ozawa as set forth in paragraphs 24-36 above is incorporated here by reference.

38. As to claims 8-10 and 26-28, Schreffler teaches functionalizing anionically prepared living polymers with functionalizing agents that include isocyanates (abstract; col. 1, line 65-col. 2 line 20; col. 3, lines 1-49; col. 5, line 42-col. 6, line 47; col. 7, line 65-68). Schreffler teaches an example with 25 wt% styrene and 75 wt% butadiene (col. 13, line 35-col. 14, line 15). Ozawa teaches adding functionalizing agents of isocyanate siloxanes and isothiocyanate siloxanes, such as 3-isocyanatopropyltrimethoxysilane, to styrene/butadiene pseudo-living polymers (abstract; page 2, line 23-page 5, line 24; page 7, lines 24-32; page 8, line 1-page 9, line 19; page 14, lines 1-30; page 17, lines 1-4; page 18, lines 1-14; page 19, lines 20-25; page 30, lines 1-30; page 32). Schreffler and Ozawa do not teach the claimed microstructure of the polymerized butadiene.

39. Vitus teaches the formation of polymers of butadiene using anionic living polymerization using alkyl lithium initiators and polar coordinators where the polybutadiene has a relative ratio of cis to trans of 25.3 cis to 40.3% trans which corresponds to the claimed 3:5 ratio and has 34.4% vinyl (abstract; col. 1, line 50-col. 2, line 33; col. 3, lines 6-35; col. 10, lines 1-52). It would have been obvious to one of ordinary skill in the art to use the method of Vitus to achieve the claimed ratios because Vitus teaches hard vulcanized rubbers which are formed from anionic living polymerization which can be terminated by addition of a terminating agent (column 4, lines 27-43, 59-65) and Vitus teaches forming star polymers which would allow the ability to add more end-groups on each polymer, thus giving more functionality to each polymer.

***Response to Arguments***

40. Applicant's arguments filed June 24, 2009 have been fully considered but they are not persuasive.
41. Applicant argues that Ozawa does not teach anionically polymerized living polymers as required by claim 1.
42. It is acknowledged that Ozawa teaches polymerization with lanthanide coordination catalysts and not through anionic polymerization.
43. However, it is noted that while claim 1 claims a method for preparing a functionalized polymer, claim 1 makes use of the product-by-process format by use of the language, "an anionically-polymerized living polymer..." Case law holds that:

Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

44. To the extent that the process limitations in a product-by-process claim do not carry weight absent a showing of criticality, the reference discloses the claimed product in the sense that the prior art product structure is seen to be no different from that indicated by the claims. Specifically, it has not been shown how the polymers in claim 1 have a structure that is different from the polymers of Ozawa.

45. While Ozawa does point out differences between polymers from coordination catalysis and anionic polymerization, no structural differences of the polymers formed are set out, but rather disadvantages in using a coordination catalyst regarding termination reactions. Since

Art Unit: 1796

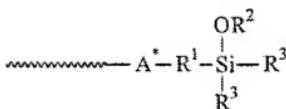
Ozawa performs the same termination reaction as is claimed, Applicant's argument is not persuasive.

46. Applicant argues the ability to react species such as functionalizing agents with polymers prepared from two different mechanisms of polymerization are entirely distinct and unpredictable. However, Applicant has not provided any evidence towards this assertion. Because it appears that Ozawa teaches the same reaction as claimed, the same polymer is being reacted with the same alkoxy silane, the same product would be formed.

47. Furthermore, it appears that after the addition of the alkoxy silane, the same product is formed in Ozawa as in the instant application. Page 2 of the instant application shows the product of the method is a polymer of the formula:



48. And page 4 of Ozawa teaches the product is the formula:



49. Note that the  $A^*$  of Ozawa is analogous to the substituents which has undergone the addition reaction, principally, the OCN- group (see page 14 of Ozawa, formula VIII). Because the same product is formed when the same alkoxy reactant is added, it can only be presumed that the same polymer is present.

50. Therefore, Applicant's arguments are not persuasive.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT C. BOYLE whose telephone number is (571)270-7347. The examiner can normally be reached on Monday-Thursday, 9:00AM-5:00PM Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ROBERT C BOYLE/  
Examiner, Art Unit 1796

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1796